

REMARKS

By this Amendment, Applicants have amended claims 72, 82, 86, 90, 95, and 98. Claims 72-99 are pending and under current examination. Each rejection set forth in the Office Action is addressed under a separate heading below. For the reasons presented herein, Applicants traverse each rejection, and respectfully assert that the application is now in condition for allowance.

Rejection of Claims 80, 82-84, 97, and 99 under 35 U.S.C. § 112, 1st ¶:

Applicants traverse the rejection of claims 80, 82-84, 97, and 99 under 35 U.S.C. § 112, first paragraph, as allegedly lacking written description. *See* Office Action, p. 3.

Regarding claim 80, the Office Action alleges that the recitation of “cleaning by an electrochemical method is not supported....” Office Action, p. 3. Applicants respectfully disagree, and direct the Patent Office’s attention to, for example, p. 18, ll. 25-30, disclosing that “it is essential to have an easy way to clean the master electrode. After a number of etching cycles, a cleaning process is normally performed. The deposit material 13 is etched away from the 30 master electrode 8.” Further, “electrochemical etching” finds support in the specification at, for example, p. 1, ll. 13-16; p. 2, l. 24 to p. 3, l. 11; and p. 7, ll. 25-27 and 30-32. In addition, the claimed “local electrochemical cell” finds support in the specification at, for example, p. 8, ll. 6-20; p. 9, ll. 9-17; and Fig. 4a (vis-à-vis the description at p. 10, ll. 7-10). Both the claimed “electrochemical etching” and the claimed “local electrochemical cell” generally find support in the specification at, for example, p. 17, l. 28 to p. 18, l. 30. Finally, the claimed “cleaning process” is also supported by original claim 6. Therefore, contrary to the allegations in the Office Action, the recitations of claim 80 are fully supported by the disclosure.

The Office Action questions support in claim 82, for the recitation of metals such as stainless steel, platinum, etc., and the recitation of “alloys”. Office Action, p. 3. Applicants

have amended the claim to remove the recitation of “alloys,” thereby obviating that portion of the rejection. With respect to the other recitations at issue, it should be noted that claim 82 recites that “*at least one of* the electrically conductive surfaces of the master electrode *and* the substrate *is chosen from a group of metals such as stainless steel, platinum...*” (emphases added). Corresponding support is located in the specification at, for example, p. 15, ll. 29-31 (copper for substrate), as well as p. 12, ll. 22-25. Thus, Applicants assert that claim 82 finds full and proper support in the disclosure.

Regarding claim 83, the Office Action questions support for the recitation of a semiconductor structure formed on the electrically conductive surface of the substrate. *See* Office Action, p. 3. In response, Applicants direct the PTO’s attention to p. 1, ll. 17-22, where exemplary support for this recitation is located. Thus, Applicants assert that claim 83 finds full and proper support in the disclosure.

Regarding claim 84, the Office Action questions support for the recitation of a conductive polymer structure formed on the electrically conductive surface of the substrate. *See* Office Action, p. 3. In response, Applicants direct the PTO’s attention to p. 1, ll. 17-22 where exemplary support for this recitation is located. Thus, Applicants assert that claim 84 finds full and proper support in the disclosure.

Regarding claims 97 and 99, the Office Action questions support for the recitation of plating on multiple electrically conductive substrates. *See* Office Action, p. 3. In response, Applicants direct the PTO’s attention to, for example, p. 15, ll. 28-31, and p. 18, ll. 21-30, noting that ECPR can be performed multiple times on electrically conductive materials, such as, for example, plating on an electrically conductive (substrate) material. *See also* p. 7, ll. 15-20. This process can be repeated multiple times. *See* p. 7, ll. 20-22. Thus, Applicants assert that claims 97 and 99 find full and proper support in the disclosure.

For the reasons discussed above, the claims fully comply with the provisions of 35 U.S.C. § 112, 1st paragraph, and the subject matter of independent claims 80, 82-84, 97, and 99 is described in the specification in such a way so as to reasonably convey to a person of ordinary skill in the art that Applicants, at the time the application was filed, had possession of the claimed invention. Applicants therefore request reconsideration and withdrawal of the rejection under 35 U.S.C. § 112, first paragraph.

Rejection of Claims 72-78, 81, 85, 93, 94, and 96-99 under 35 U.S.C. § 103(a) in View of U.S. Patent No. 6,475,369 (“Cohen”):

Claim 72 recites a unique combination including a “master electrode having an electrically conductive surface less soluble than the soluble anode material, and an insulating pattern layer arranged directly on the less soluble surface....” In contrast, in each of Cohen’s illustrated embodiments, a pattern layer is located on a *soluble* anode material. *See* Cohen, col. 15, ll. 45-60, noting that when an *insoluble* anode is used, there is no discussion of a pattern layer formed thereon. *See also* Cohen, Fig. 22, and related description at col. 20, ll. 30-41, showing that conformable mask 104 is not arranged directly on insoluble platinized titanium anode 106.

The PTO relies primarily on the following passage from Cohen to fashion a § 103(a) rejection: “[t]he anode can be soluble or insoluble, rigid or flexible, porous or nonporous, and can include an erodible layer (e.g., a metal layer) supported by a conductive material that does not erode (e.g., platinized titanium).” Cohen, col. 7, lines 48-53. *See also* Office Action, pp. 4-5. However, this passage says nothing about placing an insulating pattern directly on a less soluble surface, as recited in claim 72. Given Cohen’s illustrated examples which disclose a pattern in contact with a *soluble* anode material, the portion of Cohen cited by the PTO more likely suggests that a soluble layer would be sandwiched between a pattern layer and an

insoluble anode. Moreover, as Cohen illustrates in its Fig. 22, and discusses in the related description at col. 20, ll. 30-41, conformable mask 104 is not arranged directly on insoluble platinized titanium anode 106.

Indeed, Cohen discloses that “[u]niform plating can also be achieved by using an insoluble anode as a support, where the insoluble anode has a thin layer of a soluble coating located thereon that has a thickness calculated to provide the desired thickness of plated metal on the substrate.” Cohen, col. 15, ll. 49-53. The calculated, plated thickness of the anode layer strongly suggests that it is applied uniformly across the insoluble anode before a pattern is added. In fact, Cohen discloses that “[a]s long as the initial [soluble] coating on the insoluble anode is uniform in thickness, the plated metal will be uniform in thickness.” Cohen, col. 15, ll. 58-60. It would be much more difficult to achieve such controlled uniformity after a pattern is in place. Importantly, nowhere in connection with a discussion of an insoluble anode does Cohen teach or suggest having a pattern layer arranged directly on an insoluble surface.

The PTO is only able to fashion this rejection using the impermissible hindsight benefit of Applicants’ own disclosure of “an insulating pattern layer arranged directly on the less soluble surface,” as recited in claim 72. Thus, claim 72 patentably distinguishes over Cohen for this first reason, and it is respectfully requested that the PTO withdraw the associated § 103(a) rejection.

The unique combination of claim 72 also includes an “insulating pattern layer cooperating with the less soluble surface to define at least one cavity substantially devoid of soluble anode material....” Nowhere does Cohen teach or suggest such a devoid cavity. In each of Cohen’s examples, cavities include soluble anode material. Even in connection with its reference to an insoluble anode, Cohen never teaches or suggests a cavity devoid of soluble anode material. It is only by using the impermissible hindsight benefit of Applicants’ own disclosure of such a devoid cavity that the PTO is able to fashion this rejection. Thus, claim 72

patentably distinguishes over Cohen for this second reason, and it is respectfully requested that the PTO withdraw the associated § 103(a) rejection.

In addition, claim 72 recites that “arranging of the insulating pattern layer directly on the less soluble surface prevents soluble anode material from being disposed between the less soluble surface and the insulating pattern layer.” Each of Cohen’s illustrated examples discloses exactly the opposite-- a pattern disposed directly on the soluble surface. Cohen’s passing reference to the use of an insoluble anode does not change this fact. *See* Cohen, col. 15, ll. 45-60, and col. 20, ll. 35-36. Nowhere does Cohen teach or suggest that if an insoluble anode base is employed, it should be done in a manner so as to prevent soluble material from being disposed between the less soluble surface and the insulating pattern layer. Again, it is only through impermissible hindsight reconstruction using Applicants’ own disclosure that the PTO fashions its rejection. Thus, for yet a third reason it is respectfully requested that the PTO withdraw the associated § 103(a) rejection.

Moreover, claim 72 recites “depositing a quantity of soluble anode material on the less soluble surface of the cavity.” In connection with an insoluble anode substrate, Cohen does not disclose deposition into a cavity, but rather discloses “plated metal on the substrate.” Cohen, col. 15, l. 53. As discussed earlier, this implies application of the plating before a cavity is even formed. Importantly, nowhere does Cohen teach or suggest deposition onto a less soluble surface of a cavity as recited in claim 72. At page 5, ll. 13-15, the Office Action concedes the absence of such a teaching, noting that Cohen “does not explicitly teach whether a material is deposited within the features of the mask when the insoluble anode is used.” Thus, claim 72 patentably distinguishes over Cohen for a fourth reason, and it is respectfully requested that the PTO withdraw the associated § 103(a) rejection.

After deposition of the soluble anode material into the cavity, claim 72 recites “electrochemically transporting, through an electrolyte solution, the soluble anode material from the cavity to the electrically conductive surface of the substrate.” As mentioned above, the PTO concedes that Cohen does not teach material deposited within the features of the mask when an insoluble anode is used. *See* Office Action, p. 5, ll. 13-15. Certainly, if deposition in a cavity is not taught by Cohen, as the PTO concedes, then transporting such deposited material from a cavity to a substrate can be neither taught nor suggested. In fact, there is no discussion whatsoever in Cohen of even a redressing process in connection with an insoluble anode material, and such redressing would appear inconsistent with Cohen’s teaching of an insoluble anode supporting a thin, calculated soluble coating. *See* Cohen, col. 15, ll. 49-53. In the context of a less soluble anode, Cohen fails to teach or suggest the unique combination of “depositing a quantity of soluble anode material on the less soluble surface of the at least one cavity,” then “bringing the master electrode in close contact [with] the substrate,” and “plating at least one pattern structure on the substrate...” as recited in claim 72. Thus, the § 103(a) rejection should be withdrawn for this fifth reason.

Claim 72 also recites a unique combination “wherein the insulating pattern layer is arranged directly on the less soluble surface in a manner substantially preventing undercutting of the insulating pattern layer during plating.” Even in the context of an insoluble anode, there is no teaching or suggestion in Cohen of an arrangement that substantially prevents undercutting of its pattern layer (e.g., conformable mask 104) during plating. *See, e.g.,* Cohen, col. 20, ll. 30-36. Indeed, Cohen does not even recognize undercutting of its conformable mask 104 as an issue. Thus, claim 72 patentably distinguishes over Cohen for a sixth reason, and it is respectfully requested that the PTO withdraw the associated § 103(a) rejection.

Additionally, the § 103(a) rejection is incomplete, and not in compliance with the case law and the M.P.E.P., because the Office Action has not properly resolved the *Graham* factual inquiries, the proper resolution of which is the requirement for establishing a framework for an objective obviousness analysis. *See* M.P.E.P. § 2141(II), citing to *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), as reiterated by the U.S. Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007).

In particular, the Office Action has not properly determined the scope and content of the prior art, nor does it properly ascertain the differences between the claimed invention and the prior art, at least because it has not interpreted the prior art and considered both the invention and the prior art *as a whole*. *See* M.P.E.P. § 2141(II)(B).

Moreover, and as alluded to earlier, the Office Action resorts to impermissible hindsight to support its allegations that “one having ordinary skill in the art would envision that a soluble material can be deposited onto either a soluble or insoluble anode in order to redress or deposit additional material within the features as it would involve the same process.” Office Action, p. 5. This reasoning is based on impermissible hindsight, and “includes knowledge gleaned only from applicant’s disclosure.” M.P.E.P. § 2145(X)(A).

According to the M.P.E.P., “impermissible hindsight must be avoided and the legal conclusion [of obviousness] must be reached on the basis of the facts *gleaned from the prior art.*” M.P.E.P. § 2142 (emphasis added). It is thus important that the Examiner “step backward in time and into the shoes worn by the hypothetical “person of ordinary skill in the art” *when the invention was unknown and just before it was made.*” *Id.* (emphasis added). Thus, “[k]nowledge of applicant’s disclosure *must be put aside* … yet kept in mind in order to determine the “differences” [over the cited art].” *Id.* (emphasis added).

In this case, the Office Action alleged that one of ordinary skill in the art “would envision that a soluble material can be deposited onto either a soluble or insoluble anode in order to redress or deposit additional material within the features as it would involve the same process.” Office Action, p. 5 (emphases added). This allegation improperly takes advantage of the knowledge gleaned from Applicants’ disclosure, in that one of ordinary skill in the art, at the time the present invention was made, would not have otherwise sought to deposit a soluble material onto an insoluble anode in order to deposit additional material. That is, the only incentive for so doing would have been found in Applicants’ disclosure, and not in Cohen or in the knowledge of one of ordinary skill in the art.

Independent claim 98 contains recitations similar to those of claim 72, and is therefore allowable for the reasons discussed above in connection with claim 72. Claims 73-78, 81, 85, 93, 94, and 96, 97, and 99 depend from either claims 72 and 98 and are therefore at least allowable for the reasons that claims 72 and 98 are allowable.

The defendant claims are also separately allowable by virtue of the unique combination that each recites. By way of example only, dependent claim 96 recites that “the electrolyte solution is an optimized electrolyte in a local etching cell or a local plating cell.” The PTO alleges that Cohen’s electrolyte “is an optimized electrolyte,” but otherwise does not provide any citation or reference to Cohen whatsoever. Office Action, p. 7. According to the M.P.E.P., “rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”” M.P.E.P. § 2141(III) (citations to *KSR* and *In re Kahn* omitted). Applicants’ claimed “optimized electrolyte” is utilized to improve the disclosed ECPR process, and Applicants have described in their specification what is meant by the claimed “optimized electrolyte.” *See, e.g.*, Specification, p. 20, ll. 3-34, in particular, ll. 29-34, noting that

experiments were conducted to establish which pH-value of the electrolyte was the best.

Nowhere in Cohen is there any mention of adjusting the pH-value of the electrolyte solution.

Thus, dependent claim 96 patentably distinguishes over Cohen for this additional reason.

Accordingly, Applicants request withdrawal of the associated § 103(a) rejection.

Remaining 35 U.S.C. § 103(a) Rejections of claims 79, 80, 83, 84, 86-92, and 95 in view of Cohen, Tatsuura, Burnham, Tang, Scott, and Bernards:

Applicants request reconsideration and withdrawal of the remaining rejections of claims 79, 80, 83, 84, 86-92, and 95 under 35 U.S.C. § 103(a) as being unpatentable over Cohen in view of one or more of Tatsuura, Burnham, Tang, Scott, and Bernards.

As discussed in the previous section, Cohen does not render obvious Applicants' independent claims 72 and 98, at least because Cohen, taken alone or in combination with the knowledge available to one of ordinary skill in the art at the time of the invention, fails to disclose or suggest each and every element recited in claim 72 (and similarly in claim 98), as evidenced by the six enumerated reasons provided in the previous section, as well as the PTO's reliance on impermissible hindsight.

The Examiner applied Tatsuura, Burnham, Tang, Scott, and Bernards in individual combinations with Cohen to allegedly address the recitations of dependent claims 79, 80, 83, 84, 86-92, and 95. See Office Action, pp. 8-12. However, Tatsuura, Burnham, Tang, Scott, and Bernards, whether taken alone or in any combination with Cohen, still do not cure the deficiencies of Cohen as applied to independent claims 72 and 98, since none of those references teach or suggest the claimed combinations.

Dependent claims 79, 80, 83, 84, 86-92, and 95 are nonobvious over Cohen in view of one or more of Tatsuura, Burnham, Tang, Scott, and Bernards, at least due to those claims' respective dependence upon allowable independent claims 72 or 98. Accordingly, Applicants

respectfully request withdrawal of the remaining 35 U.S.C. § 103(a) rejections, and the timely allowance of the associated claims.

Conclusion:

Applicants request reconsideration of the application and withdrawal of the rejections. Pending claims 72-99 are in condition for allowance, and Applicants respectfully request a notice of allowance.

The Office Action contains characterizations of the invention and the related art with which Applicants do not necessarily agree. Unless expressly noted otherwise herein, Applicants decline to subscribe to any statement or characterization in the Office Action.

If the Examiner foresees any impediment to allowance, the undersigned requests a phone call from the Examiner to resolve any outstanding issue.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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